



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

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Agency for Toxic Substances
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Atlanta GA 30333

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Mr. Phil Millam
Chief
Superfund Branch
Hazardous Waste Division
EPA Region X
1200 6th Avenue
Seattle, WA 98101

Dear Mr. Millam:

Enclosed are three copies of the completed Preliminary Health Assessment on the following site prepared by the Division of Health Assessment and Consultation, ATSDR:

Tosco Corporation

We have received and taken into account your comments on the draft document previously sent to your Regional Office. We very much appreciate your comments and look forward to working with you and your staff in the future.

Sincerely yours,

Chester L. Tate Jr., P.E.
Division of Health Assessment
and Consultation

Enclosure

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PRELIMINARY Health Assessment for

TOSCO CORPORATION

SPOKANE, SPOKANE COUNTY, WASHINGTON

CERCLIS NO. WAD000641548

MAY 9 1990

Agency for Toxic Substances and Disease Registry
U.S. Public Health Service

THE ATSDR HEALTH ASSESSMENT: A NOTE OF EXPLANATION

Section 104(i)(7)(A) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, states "...the term 'health assessment' shall include preliminary assessments of potential risks to human health posed by individual sites and facilities, based on such factors as the nature and extent of contamination, the existence of potential pathways of human exposure (including ground or surface water contamination, air emissions, and food chain contamination), the size and potential susceptibility of the community within the likely pathways of exposure, the comparison of expected human exposure levels to the short-term and long-term health effects associated with identified hazardous substances and any available recommended exposure or tolerance limits for such hazardous substances, and the comparison of existing morbidity and mortality data on diseases that may be associated with the observed levels of exposure. The Administrator of ATSDR shall use appropriate data, risk assessments, risk evaluations and studies available from the Administrator of EPA."

In accordance with the CERCLA section cited, the Agency for Toxic Substances and Disease Registry (ATSDR) has conducted this Preliminary Health Assessment using the data available to ATSDR. Additional Health Assessments may be conducted for this site as more information becomes available to ATSDR.

Use of trade names is for identification only and does not constitute endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

SUMMARY

The Tosco Corporation site was proposed for the National Priorities List in Update 7. The site is located 1.5 miles north of Spokane in eastern Washington. Industrial activities, which have been conducted at the site since the 1920s, have resulted in contamination of environmental media with petroleum-derived chemicals. High concentrations of volatile aromatic compounds and polyaromatic hydrocarbons were detected in on-site soils and groundwater. The migration of contaminated groundwater from the site has impacted off-site private wells, but, to date, there is no evidence that any public water supply wells have been impacted. The use of contaminated water for potable or nonpotable purposes could result in exposures of potential health concern by ingestion, inhalation, or dermal absorption. Human contact with oil wastes in the former lagoon area could result in exposures of health concern by the ingestion, dermal absorption, or inhalation of contaminants. Such exposures would be most likely to occur during excavations in the lagoon area.

BACKGROUND

A. SITE DESCRIPTION AND HISTORY

The Tosco Corporation site is located about 5 miles northeast of the central business district of Spokane, Washington. The site, which was previously known as the North Market Street site, occupies approximately 50 acres of land in an industrialized area.

The Tosco site is currently being used as a tank farm for the bulk storage of petroleum products. Tosco purchased the property in 1976 from the Petroleum Terminal Company, a subsidiary of the Phillips Petroleum Company (PPC). While under PPC ownership, the site operated as an oil refinery until 1953 when the refinery ceased operations and was dismantled.

An unlined waste oil lagoon was located in the northwest corner of the Tosco site. A portion of this lagoon reportedly extended onto the adjacent property owned by the Draper Tractor Company. Approximately 1,000 cubic yards of oily soil were removed from the Draper property and disposed of in Colbert Landfill. The lagoon has been covered with clean soil and is currently fenced.

Since the 1920s, the site has been used for various activities associated with oil product refining, recycling, storage, disposal, transportation, and sales. As a result of these activities, soil and groundwater at the site have become contaminated with petroleum compounds. Because of the presence of numerous businesses and industries in the area, there may be additional sources of groundwater contamination off-site. Within approximately 1 mile of the intersection of North Market Street and Freya Street/Regal Street, the Washington Department of Ecology identified 16 potentially responsible parties (PRPs). Many of the PRPs are businesses that handle petroleum products.

In 1978, the Washington State Department of Ecology - Eastern Regional Office (WDOE-ERO) responded to a complaint of oil-contaminated soil at the site. In 1984, WDOE-ERO responded to a second complaint regarding groundwater contamination. The State subsequently hired Golder Associates, Inc., to investigate the site.

The Phase I Remedial Investigation Report for the site was released in October 1985, and the Data Compilation Report for the Phase I, II, and III Remedial Investigations was released in March 1988 (1,2).

B. SITE VISIT

Staff personnel from the Agency for Toxic Substances and Disease Registry (ATSDR) toured the site with representatives of Tosco and the Phillips Petroleum Company on March 17, 1989.

An on-site building is used for administrative operations. Portions of this building are leased to the Chevron Oil Company. The above ground petroleum storage tanks are surrounded by soil berms. There is heavy on-site tanker truck traffic resulting from loading and unloading operations. The site is surrounded by a 6-foot-high chain-link fence topped with barbed wire. No evidence of trespassing was noticed during the ATSDR site visit.

C. COMMUNITY HEALTH CONCERNS

The owner of the property located north of the site (Draper Tractor Company) has complained of surface oil contamination from the former oil lagoon. Owners of private wells near the site have reported petroleum-like odors in the water. No other specific community concerns were reported by the State of Washington Department of Ecology, the Washington State Department of Health, or the Spokane County Department of Health.

DEMOGRAPHICS, LAND USE, AND NATURAL RESOURCE USE

The Tosco site is located on land zoned as a "manufacturing zone." This allows for manufacturing and processing activities of all types. The nearest residential area is the Morgan Acres Community, which is located about one-fourth mile southwest of the site. The homes in this community are serviced by a public water system. The closest school is about 1 mile away. A well inventory conducted by the Washington Department of Ecology identified 228 private wells within a 3-mile radius of the site (1).

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

A. ON-SITE CONTAMINATION

During the Remedial Investigation, groundwater from on-site and off-site wells, and soil from test pits and borings in the lagoon area were analyzed for contamination. All samples were analyzed for volatile organic compounds, and selected samples were scanned for total priority pollutants (excluding pesticides).

TABLE 1: ON-SITE CONTAMINATION - GROUNDWATER

Chemical	Maximum Concentration (ug/l) (1)
benzene	43
toluene	42
ethylbenzene	14
naphthalene	450
2-methylnaphthalene	1,400
fluorene	250
phenanthrene	370
benzo(a)pyrene	14
indeno(1,2,3-c,d)pyrene	18
dibenz(a,h)anthracene	11

(1) These data were obtained for a water sample collected from the most highly contaminated on-site monitoring well (NM-4) on November 9, 1987. The sample, which was collected near the former lagoon area, was a 2-layer (non-aqueous phase liquid floating on top of the groundwater) liquid sample with a diesel oil odor. The results above are for the lower aqueous phase.

TABLE 2: ON-SITE CONTAMINATION - SOIL

Chemical	Maximum Concentration (mg/kg) (1)
benzene	11
toluene	56
ethylbenzene	26
total xylenes	170
naphthalene	52
2-methylnaphthalene	190
fluorene	25
phenanthrene	76
pyrene	28
lead	365

(1) These results were obtained for the most highly contaminated test pit soil sample (TP-8), which was collected in the former lagoon area in May 1986.

B. OFF-SITE CONTAMINATION

TABLE 3: OFF-SITE CONTAMINATION - GROUNDWATER

Chemical	Concentration (ug/l) (1)
benzene	100
toluene	6.3
ethylbenzene	55
m-xylene	42
o- and p-xylene	120

(1) These results were obtained for a water sample collected from an off-site well (Schmidt well No. 46) on May 18, 1987. This well is located about 650 feet north of the former lagoon area.

C. QUALITY ASSURANCE AND QUALITY CONTROL

In preparing this Preliminary Health Assessment, the ATSDR relies on the information provided in the referenced documents and assumes that adequate quality assurance and quality control measures were followed with regard to chain-of-custody, laboratory procedures, and data reporting. The validity of the analyses and conclusions drawn for this Preliminary Health Assessment is determined by the availability and reliability of the referenced information.

D. PHYSICAL AND OTHER HAZARDS

No physical hazards were identified at the site other than those associated with normal operations of the facility.

PATHWAYS ANALYSES

A. ENVIRONMENTAL PATHWAYS (FATE AND TRANSPORT)

Analytical data have documented the presence of numerous petroleum-derived contaminants in soil in the area of the former oil lagoon. Some of the contaminated soil has been removed, and clean fill has been placed over the lagoon area. After this remedial activity was completed, discharges of "tar" to the surface were reported in the lagoon area of the Tosco and Draper properties.

It is possible for petroleum-derived contaminants to migrate to the groundwater below. Contaminated soil may also become wind-borne, especially if the lagoon were to be excavated. No data were provided on off-site surface contamination or ambient air contamination, so it cannot be determined if there are significant concentrations of contaminants in on-site or off-site ambient air or off-site surface soil.

The site is located over the Hillyard Trough of the Spokane Valley - Rathdrum Prairie Aquifer. The Environmental Protection Agency (EPA) has designated this aquifer as a sole source of drinking water under the Safe

Drinking Water Act. Well drilling logs indicate that the glaciofluvial deposits in the area consist mostly of sand with some gravel and clay layers. Water levels at the site are 147-170 feet below ground surface, and the general groundwater flow is in a north-northwesterly direction. In the area of the former oil lagoon, there is a large quantity of a non-aqueous phase liquid (NAPL) floating on the underlying aquifer. The migration of contaminated groundwater from the site has impacted off-site wells, but the extent of contamination has not been defined.

Public water in the area is supplied by the Northern Spokane Irrigation District, which obtains water from wells tapping the Spokane Valley - Rathdrum Prairie Aquifer. The nearest public water supply well (No. GA-22) is located less than one-half mile southwest of the site, which is in an upgradient direction. No public water supply wells are located within 1 mile of the site in a downgradient direction. Monitoring of the public water supply wells has not detected, to date, any site-related contamination.

Several volatile organic compounds (VOCs) and polyaromatic hydrocarbons (PAHs) were detected in water samples collected from on-site wells. The same VOCs were also detected in off-site wells, although other off-site sources may have contributed to the contamination. The information provided to ATSDR indicated that private wells with known contamination were not being used for potable purposes.

It is unlikely that consumable animals or plants would be found in the immediate vicinity of the facility, since the site is in an industrial area. Also, there is no downslope surface water within 3 miles of the site (3).

B. HUMAN EXPOSURE PATHWAYS

1. The use of contaminated groundwater for potable and nonpotable use could result in exposures to site-related chemicals by ingestion, inhalation, or dermal absorption.
2. High concentrations of VOCs and PAHs were detected in soil samples from test pits dug in the former oil lagoon area. Human contact with these waste materials could result in exposure via ingestion, dermal absorption, or inhalation.
3. Since the Tosco site is fenced, hunting or other food gathering activities probably do not occur on-site.

PUBLIC HEALTH IMPLICATIONS

Groundwater from on-site and off-site wells was contaminated with several aromatic hydrocarbons including benzene, ethyl benzene, toluene, and xylene. The presence of these compounds in potable water can lead to their direct ingestion from drinking water or from water used in food or beverage preparation. Volatile compounds, such as benzene, may also be released to indoor air from water during showering, dish washing, and

other nonpotable water use in the home. The subsequent inhalation of these compounds in the indoor air may result in a dose that is comparable to the oral ingestion dose. These compounds may also be absorbed through the skin during bathing and other dermal contact with water. However, the dose resulting from dermal absorption would probably be less than the dose derived from oral or inhalation exposures.

Of these compounds, benzene poses the greatest potential health concern because of its demonstrated toxicity to bone marrow. Occupational exposure to benzene has been correlated with an increased incidence of blood dyscrasias, aplastic anemia, and leukemia.

Benzene was detected in groundwater from two downgradient, off-site wells (Schmidt No. 46 and R.A.Hansen No. 52) at concentrations in excess of the drinking water standard set by the EPA (5 ug/l). These wells are reportedly at business locations and are not being used for potable purposes. However, the use of water from these wells for nonpotable purposes, such as washing and toilet flushing, could lead to dermal or inhalation exposures to VOCs. The public water system is reportedly extending water lines into this area, which should eliminate the need for private wells for potable or nonpotable water.

Polyaromatic hydrocarbons were also detected in groundwater samples from an on-site well and in soil samples from a test pit in the former lagoon area. Exposure to PAHs is of potential concern because of the carcinogenicity of some PAHs and PAH mixtures (4). In laboratory experiments, PAHs are potent inducers of skin cancer when applied dermally to mice and rats. In addition, PAHs are carcinogenic in animals when ingested, injected, or intratracheally instilled.

Studies of human exposure to PAHs have been conducted among coke plant workers and coal gas production workers (5). Results of epidemiological studies of these workers have shown an association between occupational exposure to combustion products containing PAHs and cancers of the lung, pancreas, kidney, bladder, and skin. Interpretation of these studies is confounded by simultaneous exposure to other combustion products, as well as by additional chemical carcinogenic exposure from cigarette smoking.

Dermal contact with PAHs is of concern since PAHs can be absorbed by intact human skin and activated to chemically reactive intermediates that may be involved in chemical carcinogenesis (6,7). In addition, some PAHs, such as anthracene, acridine, or phenanthrene, can produce phototoxic skin reactions. Dermal exposure to these compounds, followed by exposure to sunlight, can produce skin erythema, urticaria, and burning and itching. These phototoxic effects will usually disappear when the irritant or sensitizer is eliminated.

Because of these concerns, human contact with PAH-contaminated soils and wastes in the former oil lagoon area should be avoided. The opportunity for human contact with these oil wastes has been reduced by covering the lagoon with clean fill and placing a fence around the area. However, future excavation or construction activities in the area could expose

workers to buried wastes. The unearthing of these materials could also result in the release of VOCs to the ambient air and their subsequent inhalation by on-site and off-site personnel.

CONCLUSIONS

This site is of potential health concern because of the risk to human health resulting from possible exposure to hazardous substances at concentrations that may result in adverse health effects. As noted above, human exposure to site-related contaminants may occur through the use of contaminated groundwater for potable or nonpotable use. Direct contact with contaminated soils and waste materials may also result in exposures by ingestion, inhalation, and dermal absorption. This pathway would be of particular concern during excavations in the lagoon area.

RECOMMENDATIONS

1. Potable and nonpotable wells located downgradient of the site should be regularly monitored for site-related contamination.
2. Owners of potable or nonpotable wells that have been contaminated with VOCs or other chemicals should be connected to the public water system. If public water is not available, some other alternate water source should be provided, or treatment should be implemented to remove chemical contamination.
3. Access to the former lagoon area should be restricted to properly protected and informed personnel.
4. On-site and off-site ambient air monitoring should be conducted to determine if volatile contaminants from the site pose a public health concern.
5. During excavation activities in the lagoon area, workers should be protected in accordance with regulations of the Occupational Safety and Health Administration and by the recommendations of the National Institute of Occupational Safety and Health. Appropriate air monitoring should be conducted to ensure that on-site workers and off-site residents and neighbors are not exposed to unacceptable concentrations of dusts or airborne chemicals.

In accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, the Tosco Corporation site has been evaluated for appropriate follow-up with respect to health effects studies. Although there are indications that human exposure to onsite/offsite contaminants may be currently occurring and may have occurred in the past, this site is not being considered for follow-up health studies at this time because data are not available for this decision.

PREPARERS OF REPORT

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REFERENCES

1. Golder Associates, Inc., Final Report to State of Washington Department of Ecology: Phase I Remedial Investigation of the North Market Street Site, Volume I, October 1985.
2. Golder Associates, Inc., Report to State of Washington Department of Ecology: Data Compilation Report for the North Market Street Site Phases I, II, and III Remedial Investigations, March 1988.
3. U.S. Environmental Protection Agency Hazard Ranking System packet, September 18, 1987.
4. Agency for Toxic Substances and Disease Registry, Toxicological Profile for Benzo[a]pyrene, 1988.
5. National Institute for Occupational Safety and Health, Criteria for a Recommended Standard - Occupational Exposure to Coal Tar Products, Washington, D.C. DHEW (NIOSH) 78-107, 1977.
6. Clonfero, E. et al., Mutagenic activity and polycyclic hydrocarbon levels in urine of humans exposed to therapeutical coal tar; Carcinogenesis 7(5) 819-823 (1986).
7. Kao J. et al., Skin Penetration and Metabolism of Topically Applied Chemicals in Six Mammalian Species, Including Man: An in vitro Study with Benzo[a]pyrene and Testosterone; Toxicology and Applied Pharmacology 81 502-516 (1985).